

WHAT IS CLAIMED IS:

1. An image pickup apparatus comprising:
an image pickup unit having an array of a plurality of photodetection elements;
5 a light-emitting element unit for emitting reference light having a predetermined frequency difference with respect to a frequency of light incident on said image pickup unit; and
a wave synthesizer for synthesizing the incident
10 light and the reference light from said light-emitting element unit and guiding the synthesized light to said image pickup unit.
2. An apparatus according to claim 1, wherein the
15 predetermined frequency difference is 0.
3. An apparatus according to claim 1, wherein the predetermined frequency difference is constant.
- 20 4. An apparatus according to claim 1, wherein the predetermined frequency difference is modulated according to a predetermined rule.
- 25 5. An apparatus according to claim 1, wherein said light-emitting element unit is provided in common to each of the photodetection elements.

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6. An apparatus according to claim 1, wherein said light-emitting unit includes a semiconductor laser.

5 7. An apparatus according to claim 1, further comprising a microlens array provided for each of the photodetection elements.

8. An apparatus according to claim 1, wherein
10 said wave synthesizer comprises a light waveguide provided for each of the photodetection elements.

9. An apparatus according to claim 1, further comprising an electric filter adapted to extract a
15 desired frequency band from outputs from the photodetection elements.

10. An apparatus according to claim 9, further comprising means for controlling the frequency of the
20 reference light by using an output from said electric filter.

11. An apparatus according to claim 1, further comprising an optical system for focusing light on said
25 image pickup unit, and a signal processing circuit for processing an output signal from said image pickup unit.

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12. An apparatus according to claim 1, wherein more than two image pickup units are used with being combined with each other.

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